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IMPACT OF WATER SCARCITY ON DEVELOPED AND DEVELOPING ECONOMIES

Abstract : the aim and purpose of this paper is to examine the economic impact of global water scarcity on both developed and developing nations. This paper will also examine how a lack of clean water will hurt a 51 nation's economic growth and the ability to be a viable player in global trade and be able to provide for its people. This paper will also look at the causes of water scarcity and also how the problem can be rectified.

Keywords: water scarcity, economic impact

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ВОЗДЕЙСТВИЕ ДЕФИЦИТА ВОДНЫХ РЕСУРСОВ НА РАЗВИТУЮ И РАЗВИВАЮЩУЮСЯ ЭКОНОМИКУ

Аннотация: целью и задачей настоящей статьи является изучение экономического воздействия глобального дефицита воды как на развитые, так и на развивающиеся страны. В этом документе также будет рассмотрено, как нехватка чистой воды вредит экономическому росту 51 страны и способности быть жизнеспособным игроком в глобальной торговле и быть в состоянии обеспечить своих людей. Подвергнуты анализу причины нехватки воды, а также предложены способы решения проблемы.

Ключевые слова: дефицит воды, экономический эффект

Water covers 70% of our planet, and it is easy to think that it will always be plentiful. However, freshwater—the stuff we drink, bathe in, irrigate our farm fields with—is incredibly rare. Only 3% of the world’s water is fresh water, and two-thirds of that is tucked away in frozen glaciers or otherwise unavailable for our use.

Water scarcity occurs when demand for water in a region exceeds supply or when poor quality limits the use of water. The situation is exacerbated by the inefficient use of water resources, particularly in agriculture, which consumes the majority of the region's water. Water scarcity is a complex notion. The difference between absolute and economic water scarcity is worth noting: absolute water scarcity affects regions where demand outpaces available water resources; economic water scarcity refers to situations where a lack of adequate infrastructure or services is the primary barrier to access water, rather than limited availability of the resource. Today, every year, 30% of the population in Europe experiences water stress on average. This issue is gaining prominence as climate change is projected to magnify water scarcity issues and competition across uses to access water in Europe.

Structurally, the global water landscape needs to change,” says Jessica Alford, Global Head of Sustainability Research

The gap between the world’s renewable supply of water and demand is expected to be 40% by 2030, bringing a new urgency to addressing water scarcity. The growing water crisis is a humanitarian crisis, but it also has striking economic implications. By 2050, water scarcity in some regions could impact GDP growth by up to 11.5%, the World Bank estimates[1].

Agriculture is one of the most water-dependent sectors and is highly vulnerable to water scarcity .The impact of water scarcity on agriculture is multifaceted and far-reaching, affecting not only crop yields and livestock health but also food security, the economy, and social stability. Crops and livestock require adequate water to grow and thrive. Water stress can lead to reduced crop yields, lower quality produce, and increased livestock mortality.Prolonged periods of water scarcity can lead to food shortages, which can have devastating consequences for communities reliant on local food systems.Reduced food supplies can drive up prices, making food less accessible to vulnerable populations, such as the poor and marginalized.Water scarcity can result in significant economic losses for farmers, agricultural businesses, and local economies In extreme cases, water scarcity can lead to desertification, rendering the land unsuitable for agriculture or other productive uses[3].

Industrial processes are another significant consumer of water, and scarcity can severely hamper production capabilities. Industries like textiles, chemicals, and manufacturing often require large volumes of water for cooling, processing, and cleaning. When water becomes scarce, these industries may face operational disruptions, leading to reduced output and financial losses. In some cases, companies may be forced to relocate to areas with better water availability, resulting in job losses and economic downturns in the regions they leave. The increased competition for limited water resources can also lead to conflicts with other sectors, particularly agriculture and

domestic water supply, exacerbating the overall scarcity issue. Many forms of energy production, such as hydroelectric dams and nuclear power plants, rely on abundant water supplies for cooling and operation. Reduced water levels can limit the operational efficiency of these plants, leading to decreased energy output and increased costs [2]. This, in turn, can have a ripple effect on the economy, as energy is a fundamental driver of industrial and commercial activities.

1. Hydroelectric Power Plants : In the U.S. in 2020, an average of 11,857 gallons of water was used per megawatt-hour of electricity produced. Collectively, the electric power sector used 47.5 trillion gallons of water in 2020.

2. Thermal Power Plants: According to the World Resources Institute, thermal power plants account for about 72% of the world's freshwater withdrawals

3. Nuclear Power Plants: Nuclear power plants require significant amounts of water for cooling.

In 2015, nuclear power plants in the US consumed around 320 billion gallons of water

Many of the challenges around water are due to its unique characteristics. It's difficult and costly to move, and—perhaps most importantly—the price of water doesn't reflect its true value. “Unlike most commodities, there are very few free markets to set water prices according to supply and demand dynamics,” says Connor Lynagh, an analyst covering Industrial Equipment & Technology industries. Consequently, there has been a dearth of funding for infrastructure needed to better treat, transport and conserve water. The world spends about \$850 billion annually on the provision and maintenance of water, of which just \$300 billion is capital expenditures. “This is about a third of what is spent on each of the global electrical system and global fossil fuel industry,” Lynagh adds. Looking ahead, market-based systems could become more prevalent as growing water shortages lead to increased scrutiny, greater regulation and ultimately higher costs. This poses risks to water-intensive businesses across industries—from apparel makers to

data centers—but it could open doors for more creative solutions and capital investment[3].

“Over the next four years, we estimate a \$1.4 trillion will be invested in expanding and improving global water infrastructure,” Lynagh says. The United States, every US\$1 million invested in the country’s traditional water supply and treatment infrastructure generates between 10 and 20 additional jobs. Meanwhile, the U.S. Department of Commerce’s Bureau of Economic Analysis found that each job created in the local water and wastewater industry creates 3.68 indirect jobs in the national economy. Another study in Latin America found that investing US\$1 billion in expanding the water supply and sanitation network would directly result in 100 000 jobs.

The transition to a greener economy, where water plays a central role, will also lead to more jobs. The International Renewable Energy Agency (IRENA) estimates that 7.7 million people were already employed in renewable energy in 2014 [2].

There are a number of reasons why poverty has become an epidemic in Africa. But one of the greatest causes of poverty in Africa is also the most overlooked. the lack of access to clean drinking water. Nearly one billion people do not have access to clean, safe water – that’s the equivalent of 1 in 8 people on the planet! With unclean water sources often miles from villages, many of the able-bodied members of a community are forced to spend hours each day simply finding and transporting water. The typical container used for water collection in Africa, the jerry can, weighs over 40 pounds when it’s completely full. The United Nations estimates that Sub-Saharan Africa alone loses 40 billion hours per year collecting water; that’s the same as a whole year’s worth of labor by France’s entire workforce! This is incredibly valuable time. The hours lost to gathering water are often the difference between time to do a trade and earn a living and not. The social and economic effects caused by a lack of clean water are often the highest priorities of African communities when they speak of their own development[1]. The

World Health Organization has shown this in economic terms: for every \$1 invested in water and sanitation, there is an economic return of between \$3 and \$34!

The outdoor recreation industry contributes 2.2% of the U.S. national gross domestic product, contributing—depending on how you define the scope—between \$427 and \$887 billion dollars annually to the U.S. economy. Water resources are key to all forms of outdoor recreation. Drought directly affects snow sports, such as skiing and snowmobiling, and activities conducted on rivers and lakes, such as boating, rafting, canoeing, fishing, and swimming, due to reductions in snowpack and streamflows. In addition, activities such as biking, hiking, and camping also rely on sufficient water. Drought, as well as recreationists' negative perceptions of drought, fire bans, or wildfires, may result in decreased visitations, cancellations in hotel stays, a reduction in booked holidays, or reduced merchandise sales. Reduced revenues in the sector can negatively impact the livelihood of communities and the many small outdoor recreation businesses that have limited resources to manage the financial burden of drought. This, in turn, impacts the mental health of small business owners, staff, and communities [3].

Water is a critical component of global trade, shaping transportation, agriculture, and manufacturing, but the linkages between trade and water are not limited to direct water usage by industries. Trade can also indirectly impact water resources through its impact on the environment – increased trade can lead to higher carbon emissions, which contributes to climate change and exacerbates water scarcity in many regions. The impacts of water scarcity in relation to trade are manifested in increased production costs, reduced productivity, and supply chain disruptions, and these effects in turn can have a significant impact on the global economy. Country groupings such as Small island developing states (SIDS) and Land-locked developing countries (LLDCs) are particularly vulnerable to water-related issues due to their unique geography and exposure to climate change.

Another critical linkage between water and trade is maritime shipping, one of the most important modes of transportation for global trade. Water scarcity can have a significant impact on this industry – disruptions to shipping lanes caused by low water levels can lead to delays and higher costs for importing goods, which can ultimately be passed on to consumers and lead to severe economic consequences. It is therefore also important to consider the impact of water scarcity on maritime shipping and the potential economic implications for water-scarce regions that rely on imports. Water scarcity is a growing concern in countries such as India, China, and Pakistan, who are among the world's largest consumers of water, and as their economies continue to grow, so does their demand for water. This has led to increasing competition for water resources, with implications for trade and commerce. For example, in India, water scarcity has led to lower agricultural productivity and higher food prices, affecting not only domestic consumers but also export markets. To address this challenge, India is investing in new water conservation technologies and exploring new trade agreements that could facilitate the transfer of water-saving technologies from other countries [1].

The Blue Economy Is a concept that recognises the significance of water in trade and the need to manage it sustainably; as an approach, the Blue Economy seeks to balance economic development with environmental sustainability and emphasises the need to use water resources efficiently, reduce waste, and promote conservation. In the context of SIDS like those in the Caribbean who are heavily reliant on the ocean for trade, as well as tourism and fisheries, the Blue Economy provides a framework for these sectors to be developed in responsible manner, balancing economic growth with protection of marine resources. Many SIDS face pollution challenges; harbours, which are major hubs for trade can contain high levels of contaminants from cruise ship industries and shipping activities, including oil spills, sewage, and other waste that can have a significant impact on the local environment. Loss of marine biodiversity and the

degradation of coastal ecosystems in turn affects the performance of industries such as fisheries and tourism, which are critical to the economies of many SIDS [2].

Water scarcity has significant economic impacts on agriculture, industry, human health, and recreation and tourism

- Trade and water are closely linked, and water scarcity can impact trade through increased costs and reduced productivity

- The Blue Economy provides a framework for managing water resources sustainably and balancing economic development with environmental sustainability.

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